

thereby forming an optical waveguide having a core formed from the densified material; and a cladding surrounding the core, the cladding being formed from the silica based material.

17. (once amended) A method as claimed in claim 16, wherein said bulk glass substrate has a substantially homogenous composition.

18. (once amended) A method as claimed in claim 16, wherein said bulk glass substrate has a substantially homogenous refractive index.

19. (once amended) A method as claimed in claim 18 wherein said bulk glass substrate has an optical index homogeneity of  $\Delta n \leq 5$  ppm.

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25. (once amended) A method of making a three dimensional structure within an interior of a glass body, said method comprising the steps of:

providing a glass body, said glass body having an interior, said interior having a homogeneous composition and refractive index, said glass body not being hydrogen loaded,

providing a laser beam and a lens,  
coupling said laser beam into lens to form a converging focused laser beam  
having an intensity at its focus sufficient to increase the refractive index of  
the composition of the interior of the glass body, and  
positioning said focus inside said glass body interior and controlling relative  
motion between said focus and said glass body,

thereby forming a raised refractive index waveguiding core within the interior of said glass body, said raised refractive index waveguiding core being cladded by the composition of the interior of said glass body.

26. (once amended) A method as claimed in claim 25, wherein said glass body has a first exterior side and a second exterior side, said first exterior side lying in a first plane, said second exterior side lying in a second plane, said second plane being non-parallel to said first plane, wherein said waveguiding core traverses the glass body from an input at said first exterior side to an output at said second exterior side.

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27. (once amended) A method as claimed in claim 25, said glass body having a planar exterior base side, wherein said waveguiding core traverses the glass body in a plane non-parallel to said planar base side.

28. (once amended) A method as claimed in claim 25, wherein said method includes forming a first raised refractive index waveguiding densified core path in the glass body, a second raised refractive index waveguiding densified core path in the glass body, and a third raised refractive index waveguiding densified core path in the glass body, wherein said third core is in a plane separate from said first core and said second core.

29. (once amended) A method as claimed in claim 25, wherein said composition is homogeneously doped with a glass softening dopant.

30. (once amended) A method as claimed in claim 25, wherein said interior of said glass body has an index homogeneity of  $\Delta n \leq 5$  ppm.

31. (once amended) A method as claimed in claim 25, wherein said laser beam has a wavelength  $\lambda_{\text{Laser}}$ , and said glass body has an internal transmission of at least 50%/cm at  $\lambda_{\text{Laser}}$ .

32. (once amended) A method as claimed in claim 25, wherein the difference between the refractive index of the waveguiding core and the refractive index of the unexposed interior of the glass body is at least  $1 \times 10^{-5}$  at 633 nm.

33. (once amended) A method as claimed in claim 25, wherein the difference between the refractive index of the waveguiding core and the refractive index of the unexposed interior of the glass body is at least  $1 \times 10^{-4}$  at 633 nm.

34. (once amended) A method as claimed in claim 25, wherein the laser beam is output from an excimer laser.

35. (once amended) A method as claimed in claim 25, wherein the laser beam is output from a solid state laser.

36. (once amended) A method as claimed in claim 25, wherein the laser beam is output from a 193nm excimer laser.

37. (once amended) A method as claimed in claim 25, wherein the laser beam is output from a 248nm excimer laser.

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38. (once amended) A method as claimed in claim 25, wherein said method includes forming a first raised refractive index waveguiding densified core in the glass body and a second raised refractive index waveguiding densified core in the glass body, wherein said first core is optically coupled to said second core.

39. (once amended) A method for forming a wavelength division multiplexer for multiplexing a plurality of optical wavelength channels, said method including the steps of:

forming using the method of claim 25 a plurality of waveguiding core inputs in the glass body for separately inputting the plurality of optical wavelength channels,

forming using the method of claim 25 a multiplexing region for multiplexing said inputted channels, and

forming using the method of claim 25 an output waveguiding core for outputting said multiplexed input channels.

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40. (new claim) A method as claimed in claim 16, wherein the core of the optical waveguide is at least 1 cm from each surface of the substrate.

41. (new claim) A method as claimed in claim 25, wherein the core of the waveguide is at least 1 cm from each surface of the glass body.

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42. (new claim) A method as claimed in claim 16, wherein the substrate has a thickness at least one thousand times the thickness of the core of the optical waveguide.

43. (new claim) A method as claimed in claim 25, wherein the glass body has a thickness at least one thousand times the thickness of the core of the waveguide.

44. (new claim) A method as claimed in claim 16, wherein the silica-based glass is free of germanium.

45. (new claim) A method as claimed in claim 25, wherein the composition of the interior of the glass body is free of germanium.

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